

REMARKS

Applicants thank the Examiner for the thorough consideration given the present application. Claims 1-11, 14-24 and 26-36 are currently being prosecuted. The Examiner is respectfully requested to reconsider his rejections in view of the amendments and remarks as set forth below.

Telephone Interview

Applicants note with appreciation the courtesy extended by Examiner Nadav during a telephone interview conducted on July 19, 2006. During the interview, the 35 U.S.C. § 112 rejection of claim 26 was discussed. No agreement as to allowability was reached. However, the present amendment is based on that conversation and is directed to overcoming the 35 U.S.C. § 112 rejection.

Entry of Amendment

As indicated above, Applicants have submitted the present amendment in order to help overcome 35 U.S.C. § 112 rejection of claim 26. Applicants submit that no new issues have been raised by this amendment. Instead, Applicants submit that the present amendment is an attempt to simplify the issues, especially by overcoming the 35 U.S.C. § 112 rejection.

Rejection under 35 U.S.C. § 112, first paragraph

Claims 26-36 stand rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the written description requirement. The Examiner states that the specification describes three separate elements, a covering layer, an inorganic substrate and an organic substrate,

wherein the covering layer 30 bonds the inorganic substrate 10 to the organic substrate 20. The Examiner states there is no support in the specification for the covering layer fully embedding the inorganic substrate in the organic substrate. By way of the present amendment, Applicants have removed the language “fully embedding” and instead state that the inorganic substrate is covered by the covering layer which is integrated between the organic substrates. Applicants submit that there is support in the specification for this language.

Rejection under 35 U.S.C. § 112, second paragraph

Claims 26-36 stand rejected under 35 U.S.C. § 112, second paragraph as being indefinite. The Examiner refers to the same language in claim 26 and states that it is unclear as to how a covering layer can embed a second element in a third distinct element. By way of the present amendment, this language has been changed to avoid the use of word “fully embedding”. Applicants submit that the new language is clear.

Rejection under 35 U.S.C. § 103

Claims 1-5, 7-11, 14-18, 20-24, 26-30 and 32-36 stand rejected under 35 U.S.C. § 103 as being obvious over Berger et al. (U.S. Patent 6,528,145) in view of Nishide et al. (U.S. Patent 5,827,605) and Zak (U.S. Patent 6,006,427). This rejection is respectfully traversed.

The Examiner states that Berger et al. shows an inorganic substrate 20 having wiring 26 formed thereon and two substrates including print circuit boards integrated with the inorganic substrate and one bonding layer including a ball grid array bonding the inorganic substrate and print circuit board. The Examiner admits that Berger et al. does not teach that the print circuit

boards are organic and that a passive component is formed on the inorganic substrate. The Examiner relies on Nishide et al. to teach an inorganic substrate having a passive component formed thereon. The Examiner relies on Zak to teach that printed circuit boards can be organic print circuit boards.

Applicants disagree with the Examiner's understanding of the Berger et al. reference. In Fig. 3 of Berger et al. the composite substrate has ceramic layers 22 with porosity 28. Polymeric material 32 seals the outside of the composite substrate and only partially infiltrates into it, thereby leaving most of the porosity 28 free of polymeric material 32. The polymeric material is removed from or preventing from depositing in areas 34 so that an electrical connection can be made to a semiconductor device or printed circuit board.

Amended claim 26 states that the inorganic substrate 10 is covered by a covering layer 40. The inorganic substrate is full embedded in the cover layer 40. The inorganic substrate 10 is covered by the covering layer and bonded with the two organic substrates 20 such that the inorganic substrate covered by covering layer is integrated between the organic substrates.

First, Applicants submit that the top layer of Berger's substrate 22 can not be considered as a covering layer. If the top layer is considered as a covering layer and this layer covers the inorganic substrate as the Examiner states, then the inorganic substrate is not shown. Applicants submit that a covering layer for covering the inorganic substrate which integrates with the organic substrates such that the inorganic substrate is sandwiched between the organic substrates is not taught by Berger.

At least for independent claims 1 and 14, the Examiner feels that the bonding layer is shown as the BGA layer of Berger et al. In claims 1 and 14, a bonding layer is provided between the inorganic substrate and the organic substrate for bonding the two. However, Berger et al. states that the composite substrate is now ready for semiconductor device joining and interconnection to a PCB semiconductor joining a interconnection to a PCB. Semiconductor joining can use conventional area array interconnections with or without underfill. The connections to the PCB can be made using conventional surface mount technology such as ball grid arrays (BGA), land grid arrays (LGA) or pluggable interconnections (column 10, lines 32-38).

Applicants submit that the bonding layer of the present invention is different from the BGA layer of Berger et al. In Berger, the BGA is a surface mount technology. The BGA can provide electrical connection between substrates and components. However, in the present invention, the bonding layer only provides bonding between two substrates of different materials and does not provide electrical connection between the two substrates. The electrical connection between the inorganic substrate 10 and the organic substrate 20 is connected by via holes, buried holes or blind holes. Applicants submit that the BGA technology is not suitable for the bonding of the organic or inorganic substrates because of reliability. The degradation of the ball grid array due to room temperature aging effect is known. Experimental results show that the solder ball shear may drop by 10% within three days of room temperature aging. Thus, this type of technology is not suitable for bonding the organic substrate and the inorganic substrate.

Furthermore, Applicants note that claim 26 describes that the inorganic substrate is covered by the covering layer. Applicants submit that the BGA can not be a covering layer since individual points are present on the surface, but do not “cover” the entire surface.

Further, it is noted that Berger et al. shows a composite substrate. However, this differs from the present invention which provides a composite laminate including at least an inorganic substrate and an organic substrate. The inorganic substrate is embedded with resistors, capacitors and inductors. The composite laminate is applicable for integrated and minimized electronic circuits. Therefore Applicants submit that the substrate in the invention is different from that of Berger. The invention discloses a composite laminate including at least an inorganic substrate and an organic substrate.

For these reasons, Applicants submit that independent claims 1,14 and 26 are not obvious over this combination of references.

Claims 6, 19 and 31 stand rejected under 35 U.S.C. § 103 as being obvious over Berger et al., Nishide et al., and Zak and further in view of Czjakowski et al. (U.S. Patent 6,613,978). This rejection is respectfully traversed.

The Examiner relies on Czjakowski et al. to teach a plurality of circuit boards formed on a ceramic substrate. The Examiner states it would have been obvious to form each of the organic substrates from a plurality of print circuit boards. Applicants submit that even if this reference does teach this feature, these claims are made allowable based on their dependency from allowable independent claims 1, 14 and 26.

Furthermore, Applicants submit that the other dependent claims are allowable based their dependency from allowable independent claims. In addition, each of these claims have other features that make them allowable.

Conclusion

In view of the above remarks, it is believed that the claims clearly distinguish over the patents relied on by the Examiner, either alone or in combination. In view of this, reconsideration of the rejection and allowance of all the claims are respectfully requested.

If the Examiner has any questions or comments, please contact Robert F. Gnuse, Reg. No. 27,295 at the offices of Birch, Stewart, Kolasch & Birch, LLP.

Pursuant to the provisions of 37 C.F.R. §§ 1.17 and 1.136(a), the Applicants hereby petition for an extension of one (3) months to August 9, 2006 in which to file a reply to the Office Action. The required fee of \$1020.00 is enclosed herewith.

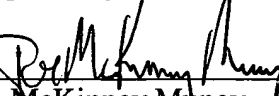
Application No. 10/619,591
Amendment dated August 1, 2006
After Final Office Action of February 9, 2006

Docket No.: 3313-1016P

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Dated: August 1, 2006

Respectfully submitted,

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